3.9 Power Production and Energy

This section discusses potential changes in power supplies and deliveries resulting from or associated with the construction, implementation, and maintenance of the Proposed Action.

3.9.1 Affected Environment

Central Valley Project Facility Descriptions

The CVP extends from the Cascade Range in the north to along the Kern River in the south and generates 5.6 billion kilowatt hours of electricity annually. The CVP facilities include reservoirs on the Trinity, Sacramento, American, Stanislaus, and San Joaquin Rivers. Water from the Trinity River is stored and re-regulated in Clair Engle Lake, Lewiston Lake, and Whiskeytown Reservoir and diverted through a system of tunnels and power plants into the Sacramento River for use in the Central Valley. CVP power plants include Keswick, Shasta, Spring Creek, Lewiston, Trinity, Judge Francis, Stampede, Folsom, Nimbus, New Melones, and O'Neill San Luis.

Water from all of these reservoirs and other reservoirs owned and/or operated by the CVP and local water rights holders flows into the Sacramento River. Some of the CVP contractors divert water directly from or immediately below the dams' outlet works. Other CVP contractors, Sacramento River water rights contractors, and water rights holders divert water directly from the Sacramento and American Rivers. The Sacramento River carries water to the Sacramento-San Joaquin Delta. The Tracy Pumping Plant at the southern end of the Delta lifts the water into the DMC. The DMC delivers water to CVP contractors and exchange contractors on the San Joaquin River. CVP power plants supply power to run the Tracy Pumping Plant, where six pumps lift water from the Delta into the DMC. The Tracy Pumping Plant does not operate to generate power supply; rather, it consumes large quantities of energy.

The CVP water is also conveyed via the DMC to the San Luis Reservoir for deliveries to CVP contractors through the San Luis Canal. Pumping stations lift the water 969 feet along this stretch to the San Luis Reservoir, which provides off-stream storage and is operated jointly by Reclamation and DWR. Water from the San Luis Reservoir also can be conveyed through the Pacheco Tunnel to CVP contractors in Santa Clara and San Benito counties. The CVP also serves water from the Friant Dam on the San Joaquin River to CVP contractors located near the Madera and Friant-Kern canals. Water is stored in the New Melones Reservoir for water rights holders in the Stanislaus River Watershed and CVP contractors in the northern San Joaquin Valley.

CVP water for irrigation is also delivered through the California Aqueduct, which carries water 300 miles southward from San Luis Reservoir along the west side of the San Joaquin Valley. The San Luis (William R. Gianelli) Pumping Plant lifts water by pump turbines from the O'Neill Forebay into the San Luis Reservoir. During the irrigation season, water is released from San Luis Reservoir back through the pump-turbines to the forebay and energy is reclaimed.

State Water Project Facility Descriptions

The SWP begins in northern California on the upper Feather River, a tributary of the Sacramento River. Runoff is stored behind Oroville Dam, which includes facilities such as the Oroville-Thermalito Complex. This complex coordinates between releasing water and producing power, where releasing water takes precedence. Power-producing facilities at Oroville Dam include Hyatt Power Plant, Thermalito Power Plant, and Thermalito Diversion Dam. These facilities operate together to move water and to generate electricity. The water then flows from Lake Oroville to the Delta where some of the water is pumped through the North Bay Aqueduct to Napa and Solano Counties.

In the southern Delta, water is pumped by the Banks Pumping Plant to feed the South Bay Aqueduct and the California Aqueduct. Similar to the Tracy Pumping Plant, Banks Pumping Plant does not operate to generate power supply; rather, it consumes large quantities of energy.

SWP water then flows through the southern San Joaquin Valley to the Tehachapi Mountains, where the Edmonston Pumping Plant raises the water 1,926 feet in a single lift to enter 10 miles of tunnels and siphons that traverse the Tehachapi range. In the southern San Joaquin Valley, the Coastal Branch was completed in 1997 and carries water to San Luis Obispo and Santa Barbara Counties.

After crossing the Tehachapis, the California Aqueduct divides into two branches. The West Branch Aqueduct stores water in Pyramid and Castaic Reservoirs to serve Los Angeles and other coastal cities. The East Branch Aqueduct flows through the Antelope Valley, storing water in Silverwood Lake. The water finally reaches San Bernardino and Riverside counties, storing water in the Lake Perris reservoir.

Joint Federal and State Facilities

Some CVP facilities (e.g., the San Luis Unit) were developed in coordination with the SWP. Both the CVP and the SWP use the San Luis Reservoir, O’Neill Forebay, and more than 100 miles of the aqueduct and its related pumping and generating facilities. These operations are closely coordinated at a Joint Operations Center in Sacramento and join with other agencies such as the

National Weather Service and the Corps for joint action during flood emergencies.

3.9.2 Approach

Methodology

A brief power impact analysis for the Intertie was completed by Reclamation that involved the modeling of the CVP power generation (power plants) and power consumption (pumping plants) resources for the baseline conditions at both a 2001 and 2020 levels of consumptive use, as well as for Proposed Action.. The differences between the 2001 and 2020 levels of consumptive use and the Proposed Action represent the power impact of implementing the Intertie.

The power impact analysis used the water delivery output from four CALSIM II studies completed by Reclamation in March 2003. These four studies were the Existing Condition at a 2001 LOD, No Action at a 2020 LOD, and the Proposed Action. Because CALSIM II is strictly an SWP/CVP water delivery model with no capability to compute changes in power generation and consumption, the CALSIM II outputs had to be post-processed by a model called LongTermGen (LTG) to determine the CVP power impacts. LTG is a Microsoft Excel spreadsheet-based Visual Basic model that was developed for the Western Area Power Administration (WAPA) by Surface Water Resources Incorporated (SWRI). LTG requires estimations of power plant and pumping energy factors (in kWh per acre-foot) for all CVP facilities. For this analysis, a pumping plant energy factor of 43.2 kWh/AF was estimated for the Proposed Action based on the assumptions of 75% average pump efficiency and 55 feet net pumping head.

It must be noted that LTG does not model any SWP facilities (or SWP share of joint SWP/CVP facilities). This limitation should not affect this analysis because there should not be any impacts on SWP power plants or pumping plants.

Significance Criteria

For electricity generation and consumption, the environmental consequences of the project are measured in terms of how the operation of the project would affect the net energy requirements of CVP facilities.

Effects on CVP net energy requirements would be considered significant if net electricity consumption increased substantially. For this analysis, a substantial increase is defined as an increase in net electricity consumption of more than 10%.

3.9.3 Environmental Consequences

No Action Alternative

The No Action Alternative reflects the condition of the CVP and SWP pumping and generation if the Intertie is not constructed or implemented. Without the Intertie, pumping and generating facilities would operate as under existing conditions. There would be no changes in CVP or SWP pumping or generation and no new power facilities would be constructed or operated. Therefore, no effects would be associated with the No Action Alternative.

Proposed Action Alternative

The Intertie would cause irreversible and irretrievable commitments of nonrenewable energy resources needed to construct, implement, and maintain project structures and programs. These resources include water, gasoline, diesel fuel, and the fossil fuels used to generate electricity for construction, operation, and maintenance. The anticipated increase in project energy use at the Tracy Pumping Plant and the Intertie pumps also would cause irreversible commitments of resource if nonrenewable resources were used to generate electricity. During construction of the Intertie and associated project structures, the extent to which the resources would be used is limited, as the work is temporary and requires a relatively small area.

Impact POW-1: Increased Electricity Consumption as a Result of Operating the Intertie

According to the results of the power impact analysis modeled by CALSIM II and LTG, implementing the Proposed Action should result in only a minor increase in the energy consumption of the CVP. Average power impacts of the Proposed Action compared to simulated 2001 and 2020 baseline levels of consumptive use equal 1.1% and 1.8%, respectively. These increases are considered to be than significant, with significance defined as an increase of 10% or more.

According to the modeling values, the power impact attributable to the Proposed Action is minimal and insignificant as a percentage of the overall level of CVP power production and power consumption. The impact is considered to be less than significant. No mitigation is required.

3.9.4 Cumulative Impacts

Cumulative effects on power capacity, generation, and energy use would be considered potentially significant if the total effect of anticipated changes in water project operations resulted in a net energy reduction caused by the operation of new facilities with associated pumping load and increased power and energy demands of urbanization. As discussed above, the overall energy consumption in result of operation of the Proposed Action should result in only a minor increase (1.1% and 1.8%) and is considered to be less than significant. The proposed project would not result in potentially significant cumulative impacts.